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G4A AUXF

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(54) Abstract Title
A financial risk and exposure management system

(57) In a financial risk and exposure management system (1) a server (2) receives pre-deal limit check, exposure update, and violation alert data in real time from remote dealing systems (4). A database (3) stores static tables of data including master agreement data. Dynamic tables of data including details of existing netting agreements are linked with the master tables. The server (2) executes a modelling engine to apply a series of validity tests for a proposal vis-a-vis a stored netting agreement. It then automatically calculates exposure.

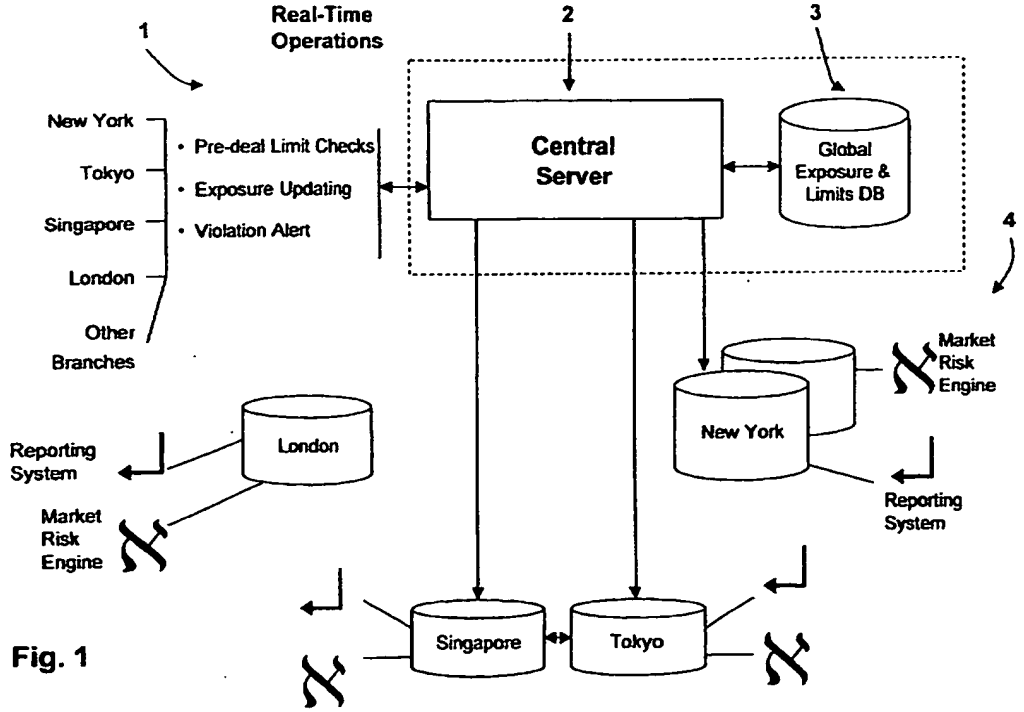


Fig. 1

GB 2 354 608 A

This print incorporates corrections made under Section 117(1) of the Patents Act 1977.

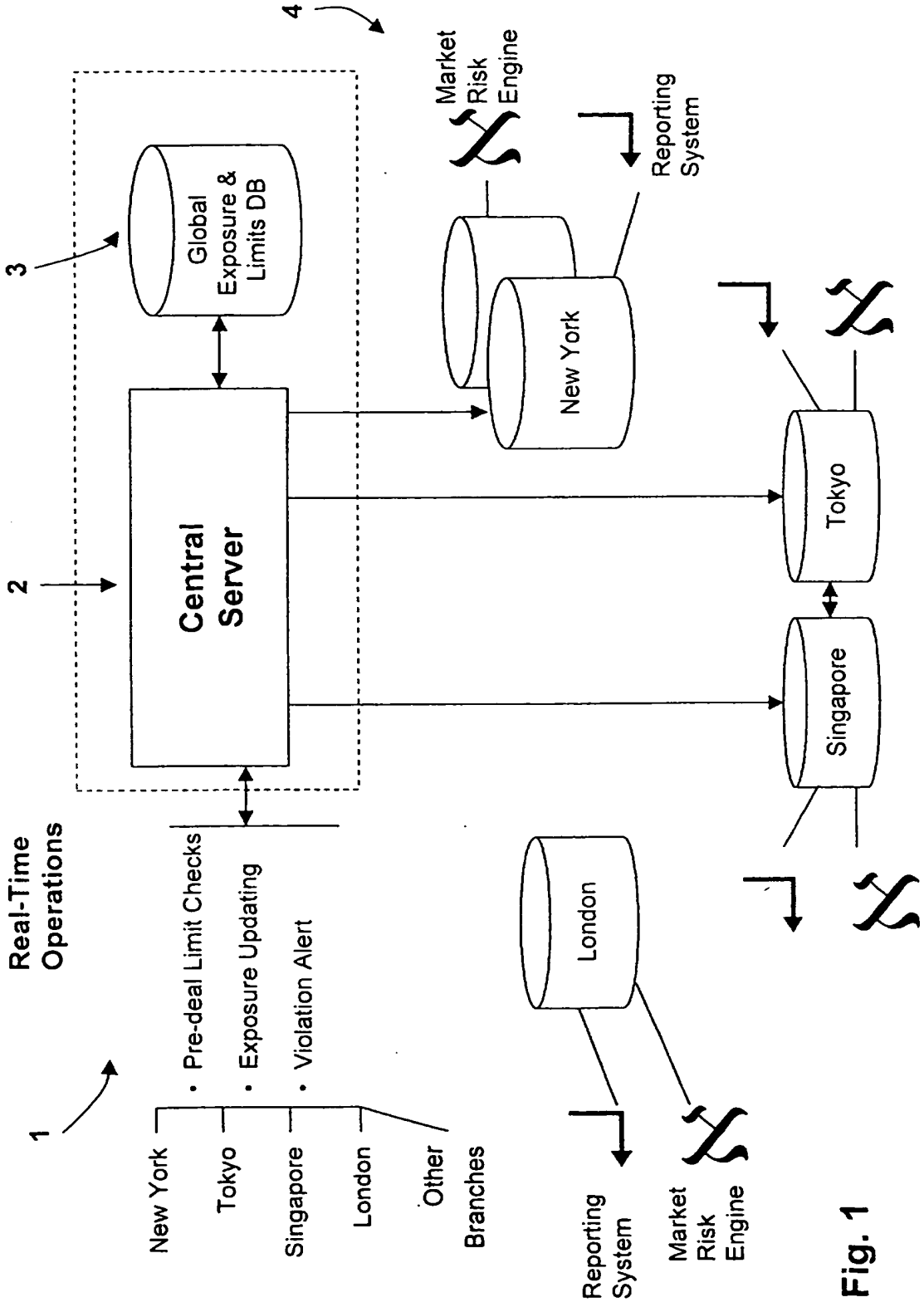

4
Market Risk Engine
Reporting System
3
Global Exposure & Limits DB
New York
2
Central Server
Tokyo
Singapore
Real-Time Operations
• Pre-deal Limit Checks
• Exposure Updating
• Violation Alert
1
New York
Tokyo
Singapore
London
Other Branches
London
Reporting System
Market Risk Engine

Fig. 1

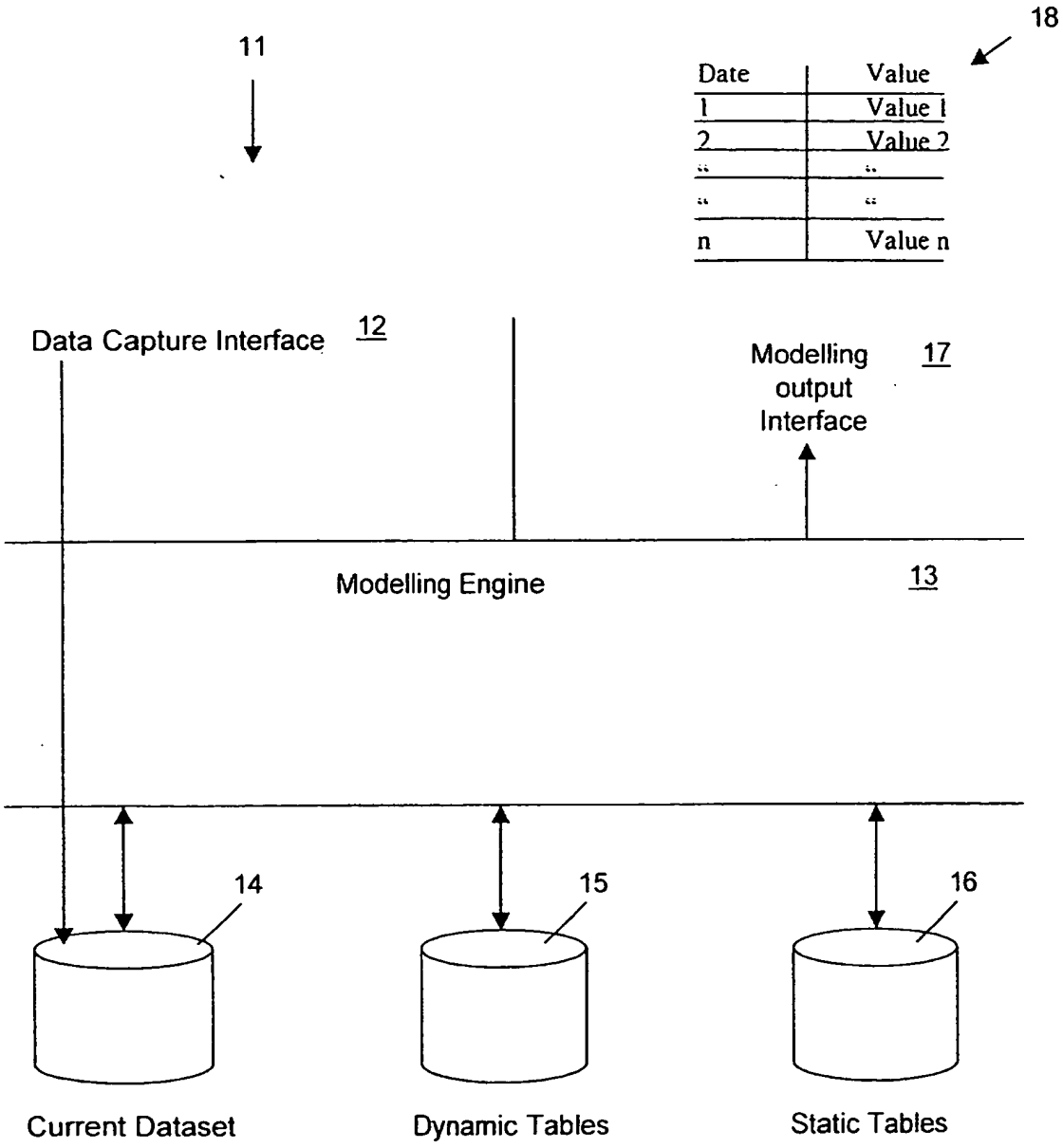

11
18
Date
Value
1
Value 1
2
Value 2
n
Value n
Data Capture Interface
12
Modelling output Interface
17
Modelling Engine
13
14
15
16
Current Dataset
Dynamic Tables
Static Tables

Fig. 2

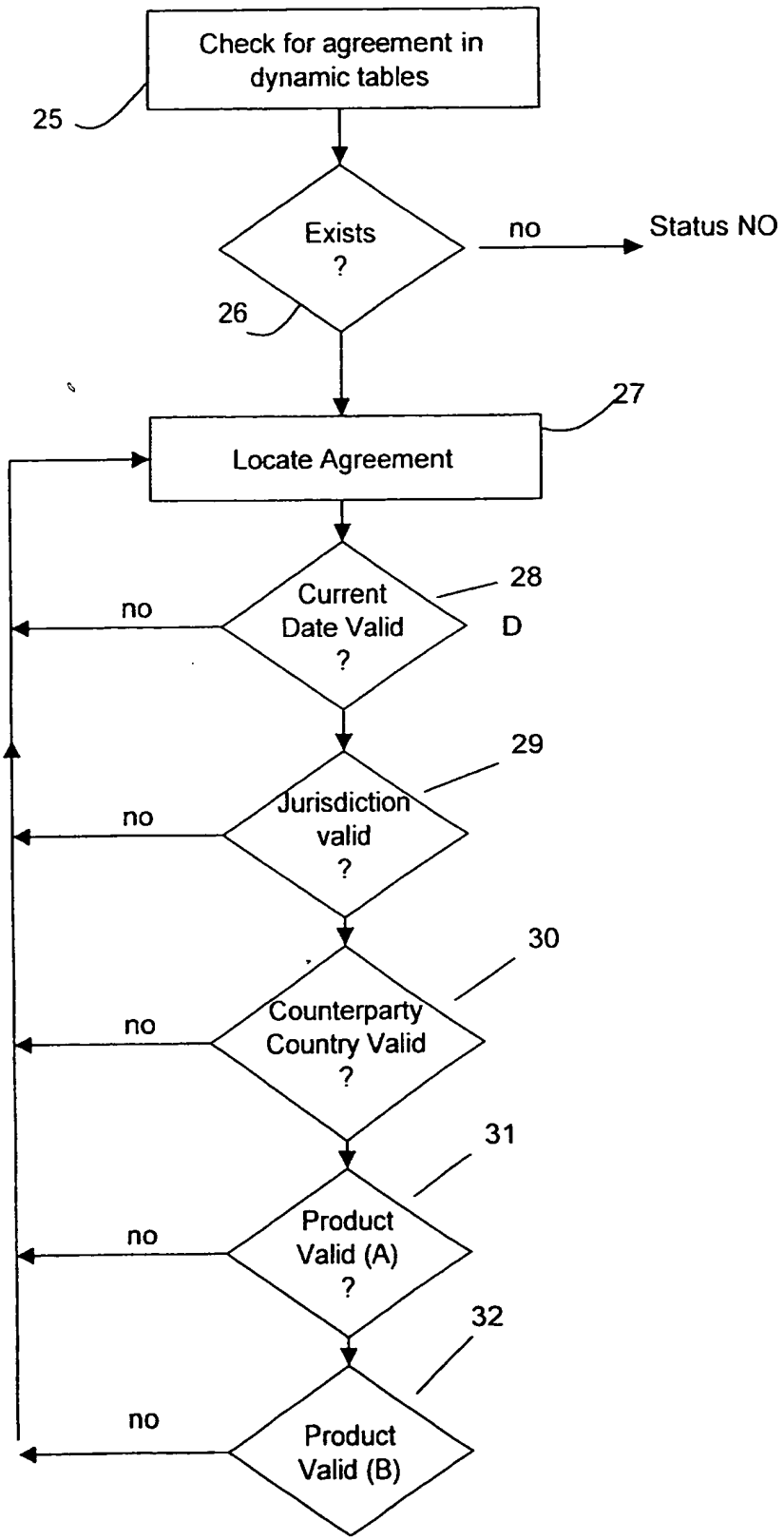

Check for agreement in dynamic tables
25
Exists ?
no
Status NO
26
27
Locate Agreement
Current Date Valid ?
28
D
no
Jurisdiction valid ?
29
no
Counterparty Country Valid ?
30
no
Product Valid (A) ?
31
no
Product Valid (B)
32
no

Fig. 3(a)

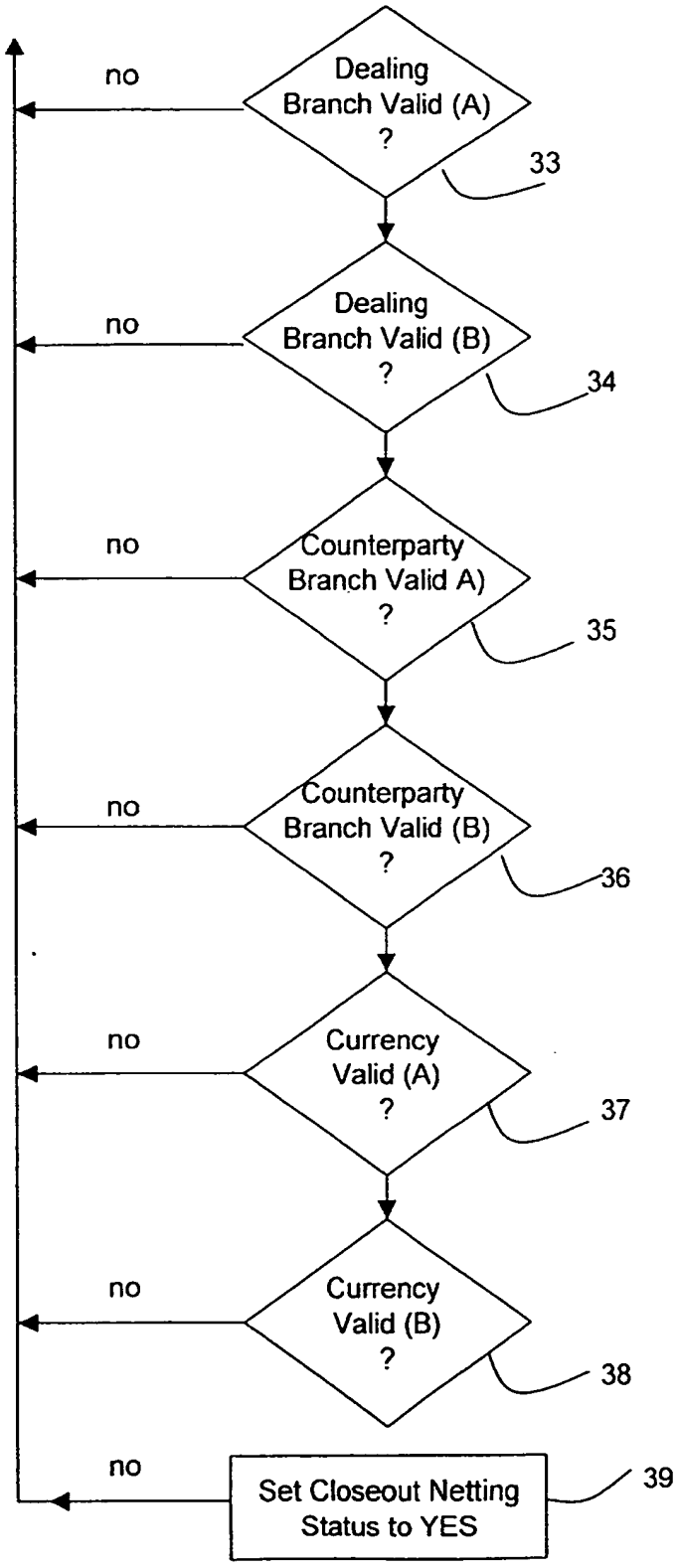
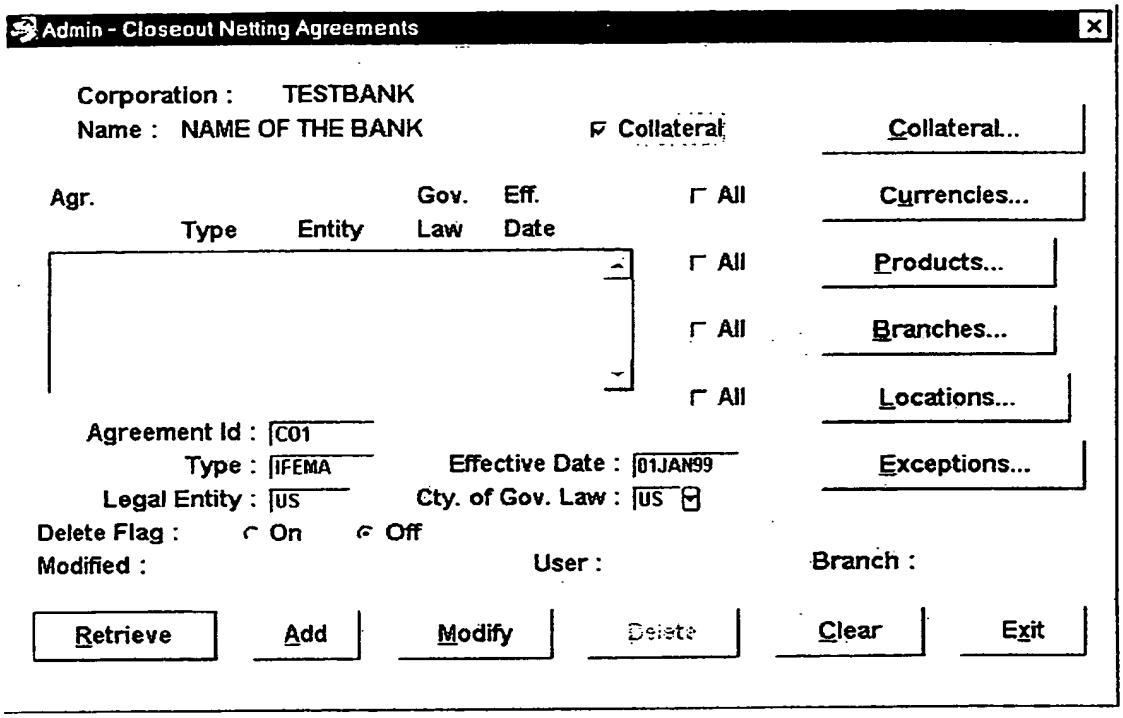

Dealing Branch Valid (A) ?
no
33
Dealing Branch Valid (B) ?
no
34
Counterparty Branch Valid A) ?
no
35
Counterparty Branch Valid (B) ?
no
36
Currency Valid (A) ?
no
37
Currency Valid (B) ?
no
38
Set Closeout Netting Status to YES
no
39

Fig. 3(b)

Closeout Agreement

Fig. 4



Closeout Netting Currencies

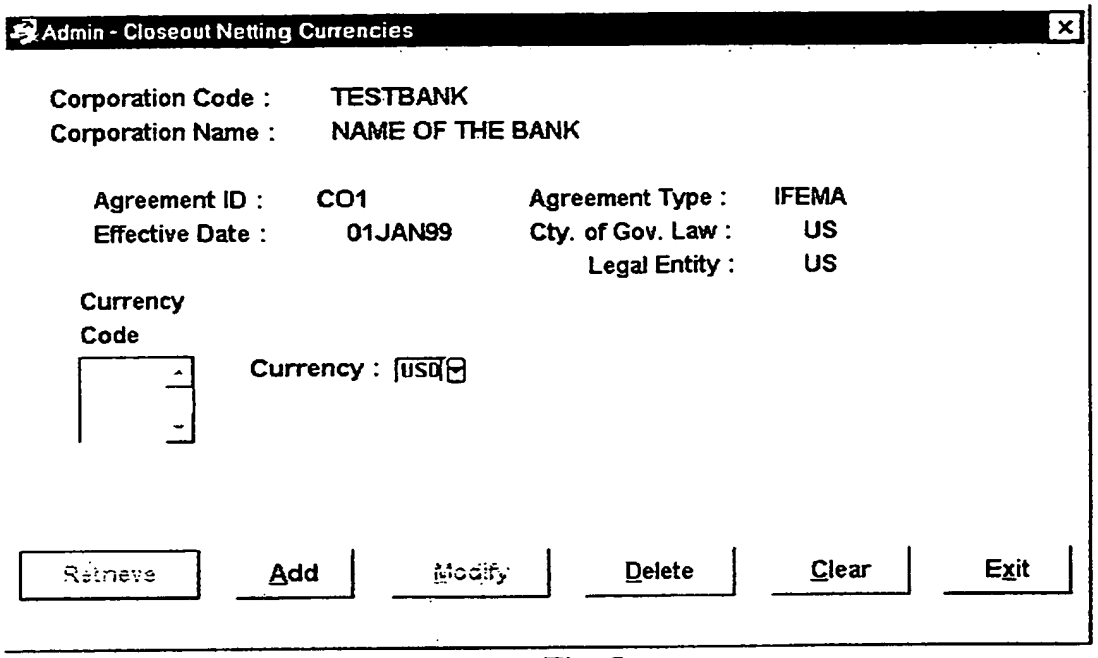
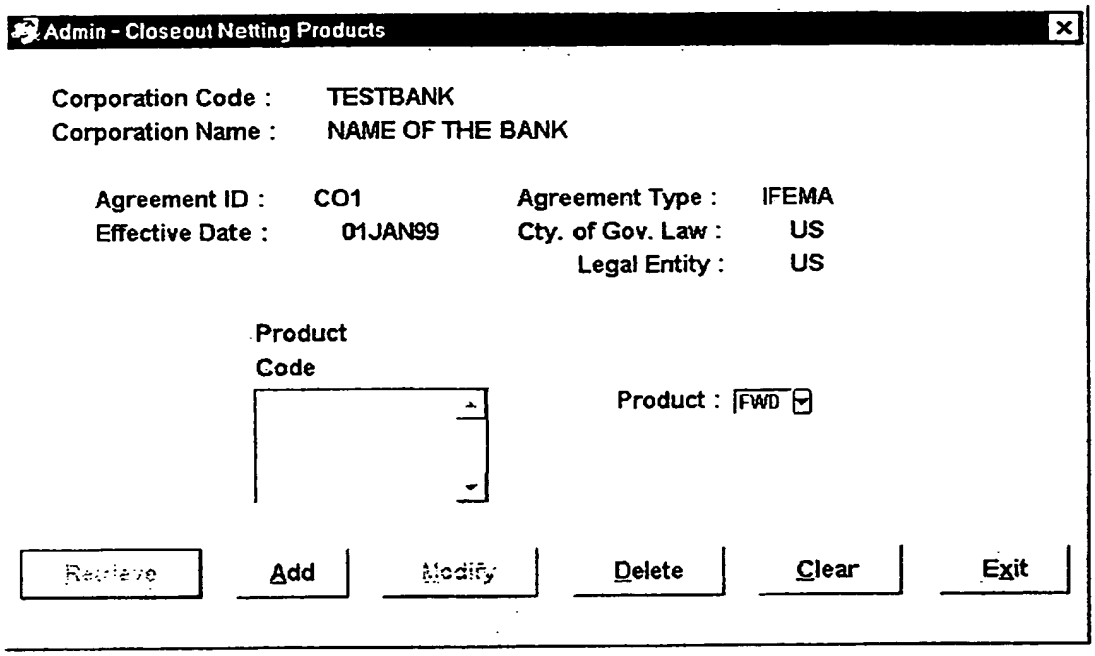


Fig. 5

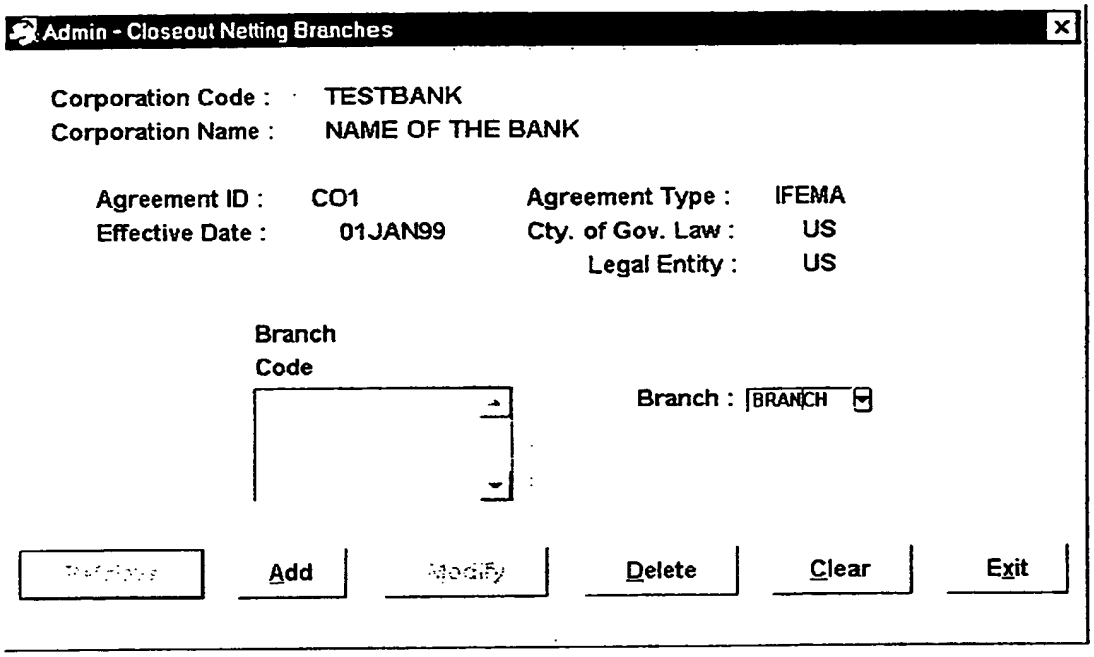
Closeout Netting Products

Fig. 6



Closeout Netting Branches

Fig. 7



Closeout Netting Locations

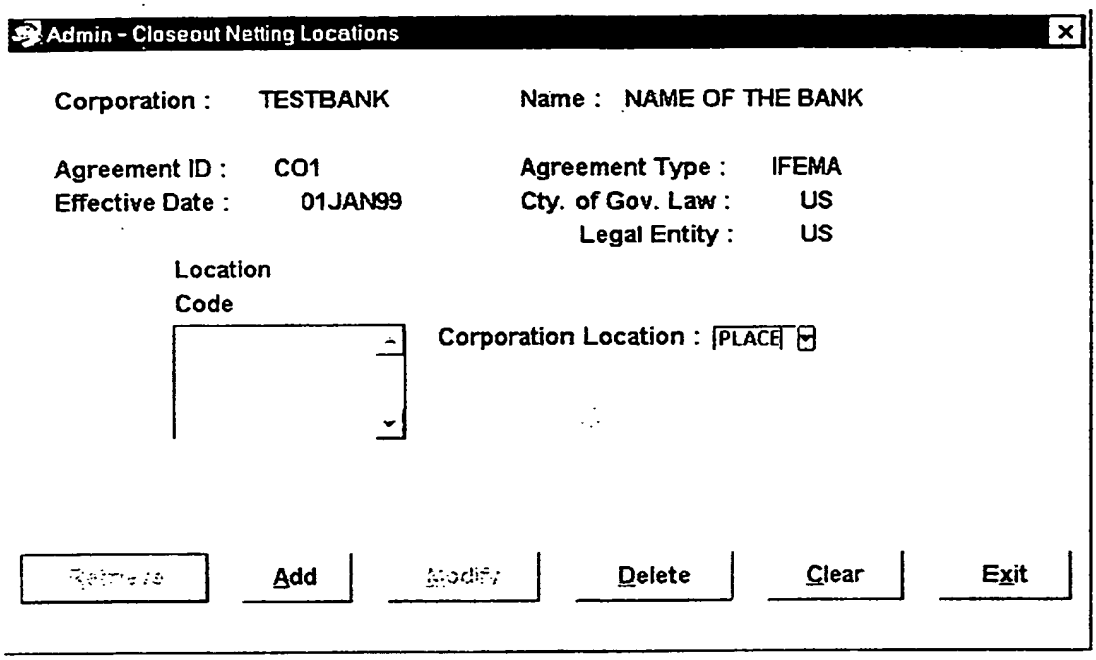


Fig. 8

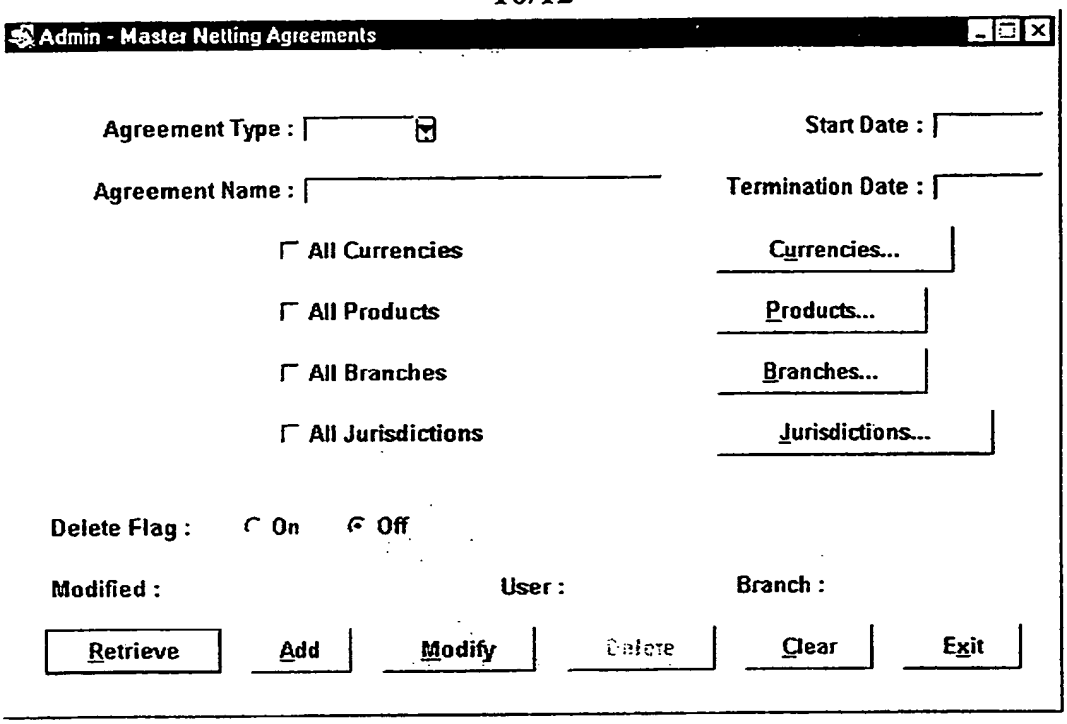


Fig. 9 Master Agreement

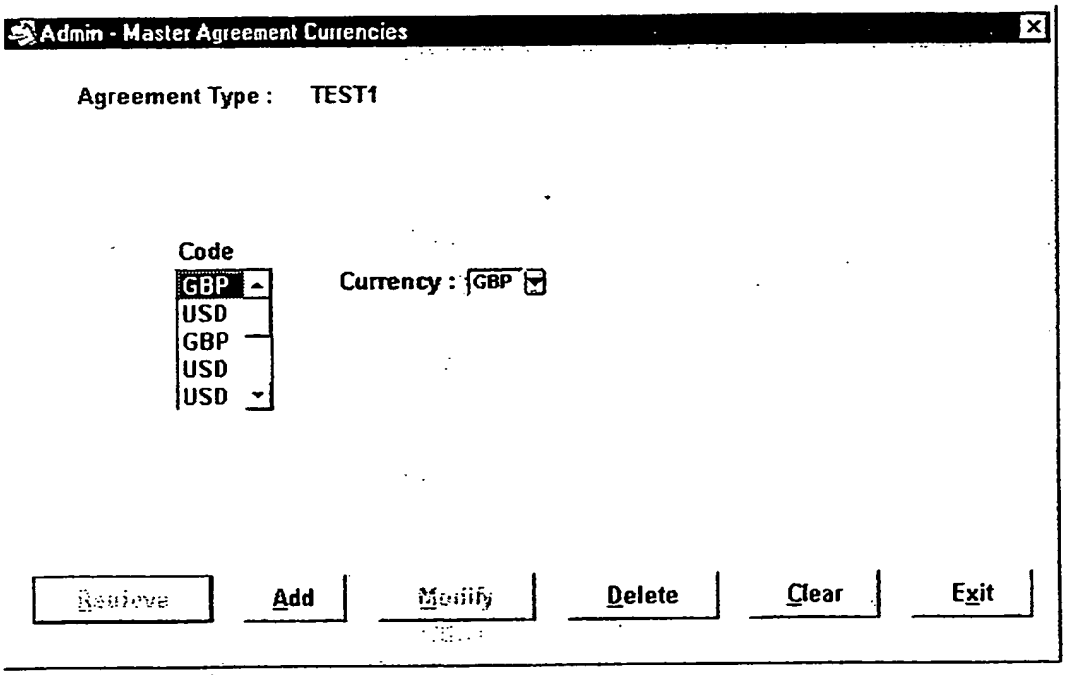


Fig. 10 Currencies

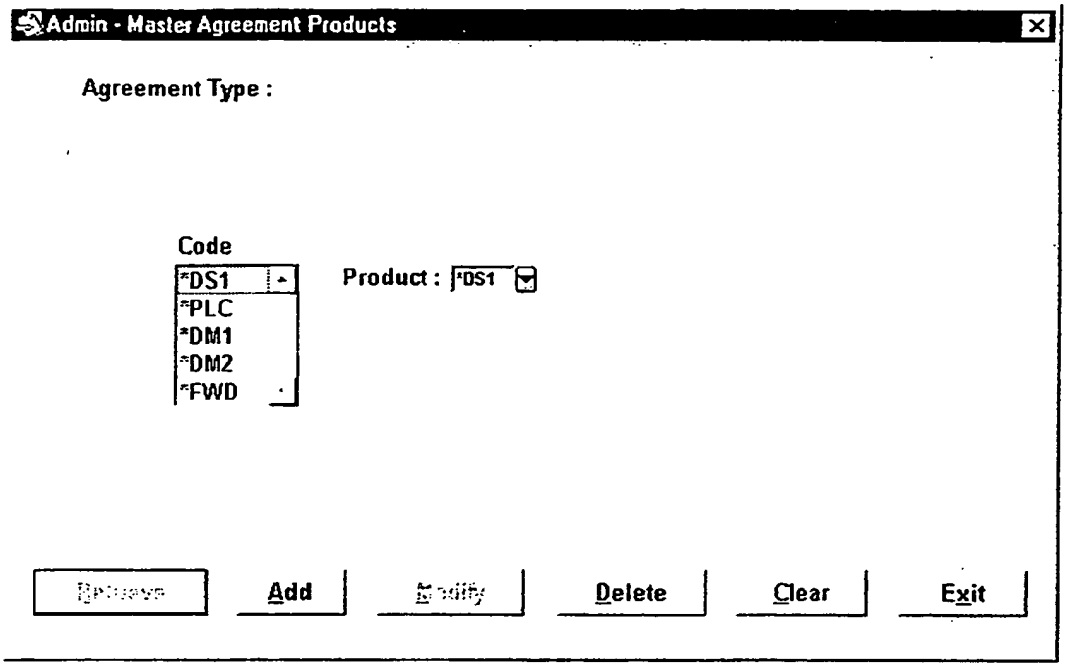


Fig. 11 Products

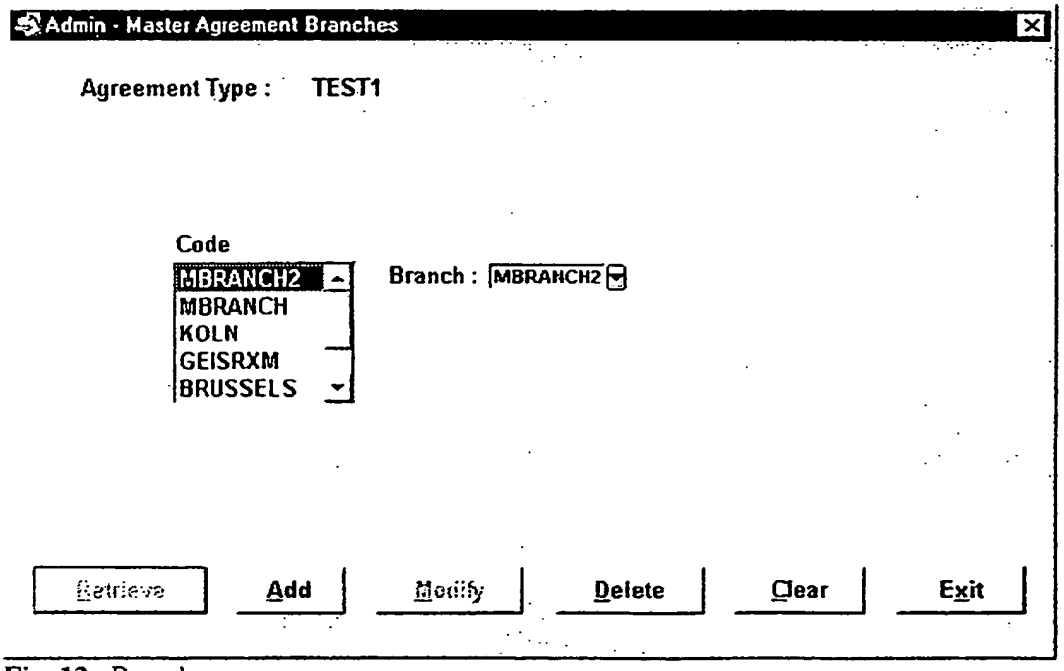


Fig. 12 Branches

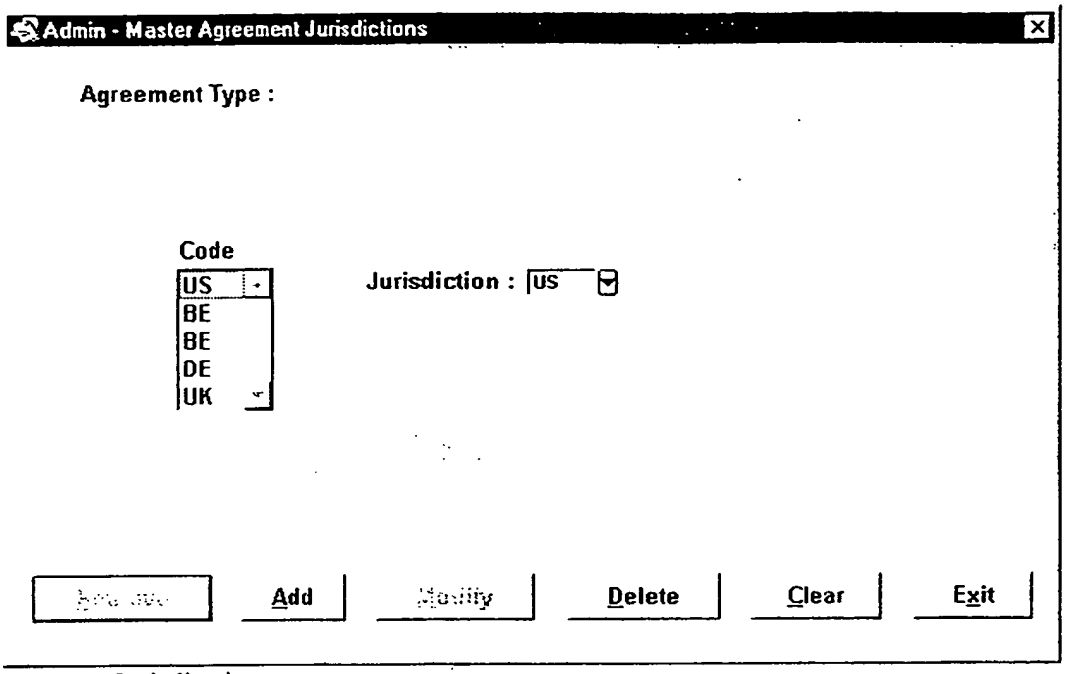


Fig. 13 Jurisdication

"A Financial Risk and Exposure Management System"

INTRODUCTION

Field of the Invention

The invention relates to a system for management of financial risk or exposure.

Prior Art Discussion

In recent years, organisations such as financial institutions have increasingly entered into agreements with third parties in order to reduce exposure for deals such as derivatives deals. One example is close-out netting. A close-out netting agreement is made between a financial institution and a counterparty. It states that in the event of counterparty default, the total position with that counterparty will be treated as the result of close-out all qualifying contracts. Thus, the financial institution exposure in the event of counterparty default is the netted sum of all trades covered by a close-out netting agreement. Therefore, there is a single balancing amount to be paid by one party.

While such agreements are very important instruments for financial institutions and other similar organisations, administration is particularly difficult. This is because of the financial and legal complexities involved. For example, close-out netting agreements are only legally allowable in a certain limited number of countries. Also, within these countries various constraints apply.

Objects of the Invention

It is therefore an object of the invention to provide a financial risk or exposure management system which manages the creation and maintenance of agreements in a manner which is both effective and minimises user time input required.

SUMMARY OF THE INVENTION

According to the invention, there is provided a financial risk and exposure management system comprising a user interface comprising means for receiving user data for a proposed transaction, and a modelling engine comprising means for determining eligibility of the proposed transaction to an agreement with a counterparty.

Preferably, the modelling engine comprises means for accessing static tables storing eligibility data.

In one embodiment, the static tables comprise tables containing master agreement, eligible countries, eligible branches, and eligible product data.

In another embodiment, the modelling engine comprises means for accessing dynamic tables storing agreement data for existing agreements and counterparties.

In one embodiment, the modelling engine comprises means for accessing secondary dynamic tables storing data for groupings of correlated parameters.

Preferably, the engine comprises processing means for operating according to rules to access the static and dynamic tables in a controlled manner to generate a proposal response.

In another embodiment, the processing means comprises means for executing a controlled sequence of tests comparing the received user data with data in the static and dynamic tables until an eligibility status flag is set to positive.

Preferably, the modelling engine comprises means for executing a test in both static and dynamic tables for each proposal attribute.

In one embodiment, the modelling engine comprises means for operating in a fixed sequence of tests, in which each test has an associated date access address for fast response times.

In another embodiment, the modelling engine comprises means for automatically performing an exposure calculation if the status flag is positive.

Preferably, the calculation generates a set of projected exposure values for future deal dates.

According to another aspect the invention provides a computer program product comprising software code for completing a system as defined above when loaded in a digital computer.

DETAILED DESCRIPTION OF THE INVENTION

Brief Description of the Drawings

The invention will be more clearly understood from the following description of some embodiments thereof, given by way of example only with reference to the accompanying drawings in which:-

Fig. 1 is a schematic overview of a financial risk and exposure management system of the invention;

Fig. 2 is a diagram illustrating a part of the system for processing close-out netting agreements;

Figs 3(a) and 3(b) are together a flow diagram illustrating operation of the part of the system shown in Fig. 2; and

Figs. 4 to 13 are sample display screens to illustrate operation of the system.

Description of the Embodiments

Referring to Fig. 1, there is shown a risk and exposure management system 1. The system 1 comprises a central server 2 having a global exposure and limits database 3. This database is updated in real time by geographically spread dealing systems, indicated generally by the numeral 4. Each of these systems comprises a market risk engine and a reporting system which both interact in real time with the central server 2. In addition to real time financial data updating, the systems 4 also input parameter values such as pre-deal limit checks, exposure updating, and violation alerts.

The dealing systems and the server are programmed to manage exposures dynamically, rather than simply imposing limits. This is achieved by combining one or more contract attributes or derived values such as Counterparty, Country, Currency, or Product to form an exposure consolidation key. This key identifies an exposure consolidation category and associated rules process.

A major function performed by the server 2 is close-out netting management. This functionality is performed by a sub-system 11 shown in Fig. 2.

A data capture interface 12 is programmed to interactively prompt user input of data for proposed agreements and transactions and other query data. The sub-system 11 also

comprises a modelling engine 13 which comprises a processor operating in response to rules to interrogate various datasets and provide outputs to the user. The datasets comprise a current dataset 14 of user-inputted data for a particular query or proposal agreement. It also comprises a set of dynamic tables 15 and a set of static tables 16.

The sub-system 11 also comprises a modelling output interface 17, and a sample output 18 is illustrated in Fig. 2.

A table of Master Agreements is maintained containing:-

The master agreement identification code
The agreement name
Indicators for additional constraints on the attributes.
Branches of the parent bank
Dealing product types
Currencies

If an additional constraint is required an associated table is constructed holding the authorised values for that attribute for this master agreement. An associated table holding the authorised list of jurisdiction countries for this master agreement is maintained. These tables change relatively infrequently and are therefore referred to in this specification as "static" tables 16.

A table of counterparty close-out agreements is maintained containing:-

Counterparty identification code
Agreement identification code
Master agreement identification code
Country of applicable law
Effective date of agreement
Collateral Annex Indicator

Current Collateral Value

Indicators for additional constraints on the attributes

Currencies covered by this agreement

Products covered by this agreement

Branches of the parent bank covered by the agreement

Branches of the counterparty covered by this agreement

If any additional constraints are required an associated table is constructed holding the authorised values for that attribute for this specific agreement. These tables are amended frequently in response to generation of new agreements and modification of existing ones. The counterparty agreement table and these subsidiary tables are therefore referred to as "dynamic" tables 15. The dynamic tables are essentially subsets of the static master agreement table and its subsidiary static tables.

Referring to Figs. 3(a) and 3(b) a process comprising steps 25 to 39 is now described. This process is carried out by the modelling engine operating 13 according to rules defining a controlled process and accessing the static and dynamic tables.

An important aspect of the modelling engine 13 is that it operates in a highly controlled manner to follow a test execution sequence such as that illustrated in Figs. 3(a) and 3(b). Each rule which requires data access is coded with the address of the relevant table. Because the datasets are in dynamic and static groups, and because the dynamic tables have subsidiary tables identified by parent dynamic table records there is very fast data access. Also, there are secondary tables which correlate groupings of related data. This minimises the number of accesses required. Thus, in most instances, a rule can access required data derived from a correlation of, for example, an agreement and a counterparty in a single access in which time is delayed only by a single index and table access cycle. These features allow excellent real time performance of the system, even if there are thousands of counterparties.

The data capture interface 12 receives user data for a proposed transaction. In step 25 the engine checks if the proposal is eligible for close-out netting treatment under an existing agreement with the relevant counterparty. The data captured for this purpose is:-

Counterparty Identification Code
Counterparty HQ Country
Product code
Dealing branch code
Dealing Branch Country
Counterparty branch or location code
Counterparty branch country
Currency code or codes of the transaction or contract

If no agreements are found then a Close-out Netting Status is set to NO, as indicated by step 26. If an agreement is located, the engine 13 then checks each agreement for this counterparty against the process steps below until it determines that the close-out status is YES. If the agreement list is exhausted before this condition is found then the close-out status is NO and a process exit is taken. If the close-out status for an agreement is set to YES the process exit is taken.

Location of an agreement is indicated in step 27, and in step 28 the current date is checked against the effective date. If the effective date is in the future the process returns to step 27.

The country of applicable law is checked in step 29 against the list of authorised jurisdictions for the designated master agreement. If the country is not included in the authorised list the process returns to step 27.

The country of counterparty HQ is checked in step 30 against the list of authorised jurisdictions for the designated master agreement. If the country is not included in the authorised list the process returns to step 27.

The product attribute constraint indicator is checked in step 31. If a product constraint is in effect the product code is checked against the list of authorised products for this counterparty close-out agreement. If the product code is not found in this list the process returns to step 27. The product attribute constraint indicator for the associated Master Agreement is checked in step 32. If a product constraint is in effect the product code is checked against the list of authorised product for this master agreement. If the product code is not found in this list the process returns to step 27.

The dealing branch attribute constraint indicator is checked in step 33. If a dealing branch constraint is in effect the dealing branch code is checked against the list of authorised dealing branches for this counterparty close-out agreement. If the dealing branch code is not found in this list the process returns to step 27.

The dealing branch country code is checked in step 34 against the list of authorised jurisdiction countries for this master agreement. If the dealing branch country code is not found in this list the process returns to step 27.

The counterparty branch attribute constraint indictor is checked in step 35. If a counterparty branch constraint is in effect the counterparty branch code is checked against the list of authorised counterparty branches for this counterparty close-out agreement. If the counterparty branch code is not found in this list the process returns to step 27.

The counterparty branch country code is checked in step 36 against the listed of authorised jurisdiction countries for this master agreement. If the counterparty branch country code is not found in this list the process returns to step 27.

The currency attribute constraint indicator is checked in step 37. If a currency constraint is in effect the currency code is checked against the list of authorised currencies for this counterparty close-out agreement. If the currency code is not found in this list the process returns to step 27.

The currency attribute constraint indicator for the associated Master Agreement is checked in step 38. If a currency constraint is in effect the currency code is checked against the list of authorised currencies for this master agreement. If the currency code is not found in this list the process returns to step 27.

The close-out netting status is then set to YES and the process returns to step 27.

The engine 13 then proceeds to calculate the counterparty credit value of transactions in a proposed agreement provided the status is YES. The data capture interface 12 captures the following data:-

Counterparty code
Close-out Netting agreement identifier
Transaction Mark to Market value (MtM)
Transaction Potential Future Exposure value (PFE)
Transaction exposure maturity date

For all transactions with the same counterparty code and close-out netting agreement identifier code the engine calculates:-

The sum of all the MtM values and the sum of all positive MtM values.

A mitigating factor (MF) is calculated using the formula 0.4 + 0.6* sum of all MtM values divided by the sum of all positive values.

The counterparty credit risk of all transactions included in the close-out netting agreement is calculated from the formula:-

Maximum (sum of all MtM values or Zero) +sum of all PFE values multiplied by the mitigating factor.

The counterparty credit risk value of all transactions which are still active o any future date is calculated by summing the MtM values and PFE values for all transactions on that date where the transaction exposure maturity date is later than the selected date. A sample output is shown in Fig. 2.

Referring now to Figs. 4 to 13 system display screens are shown to assist in understanding the composition of the tables and the manner in which the modelling engine operates. Editing of a closeout agreement table is shown in Fig. 4. This table includes markers or flags for related tables for currencies (Fig. 5), products (Fig. 6), branches (Fig. 7), and locations (Fig. 8). These tables are all dynamic. There are also secondary dynamic tables for groupings or correlations of data such as a grouping of a particular counterparty and a particular agreement.

The primary static table is a master agreement table, editing of which is shown in Fig. 9. Figs. 10 to 13 illustrate related tables as follows:

Fig. 10: currencies,
Fig. 11: products,
Fig. 12: branches, and
Fig. 13: jurisdiction.

These tables are updated relatively infrequently.

It will be appreciated that the invention provides for comprehensive agreement processing for risk and exposure management. This has been achieved with very fast response times to allow real time operation where workstations are widely spread geographically.

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The invention is not limited to the embodiments described, but may be varied in construction and detail within the scope of the claims. For example, the invention may be applied to processing of agreements between counterparties other than close out netting agreements, such as general netting agreements.

Claims

1. A financial risk and exposure management system comprising a user interface comprising means for receiving user data for a proposed transaction, and a modelling engine comprising means for determining eligibility of the proposed transaction to an agreement with a counterparty.

2. A system as claimed in claim 1, wherein the modelling engine comprises means for accessing static tables storing eligibility data.

3. A system as claimed in claim 2, wherein the static tables comprise tables containing master agreement, eligible countries, eligible branches, and eligible product data.

4. A system as claimed in any preceding claim, wherein the modelling engine comprises means for accessing dynamic tables storing agreement data for existing agreements and counterparties.

5. A system as claimed in claim 4, wherein the modelling engine comprises means for accessing secondary dynamic tables storing data for groupings of correlated parameters.

6. A system as claimed in any preceding claim, wherein the engine comprises processing means for operating according to rules to access the static and dynamic tables in a controlled manner to generate a proposal response.

7. A system as claimed in claim 6, wherein the processing means comprises means for executing a controlled sequence of tests comparing the received user data with

data in the static and dynamic tables until an eligibility status flag is set to positive.

8. A system as claimed in claim 7, wherein the modelling engine comprises means for executing a test in both static and dynamic tables for each proposal attribute.

9. A system as claimed in any of claims 6 to 8, wherein the modelling engine comprises means for operating in a fixed sequence of tests, in which each test has an associated date access address for fast response times.

10. A system as claimed in any preceding claim, wherein the modelling engine comprises means for automatically performing an exposure calculation if the status flag is positive.

11. A system as claimed in claim 10, wherein the calculation generates a set of projected exposure values for future deal dates.

12. A system substantially as described herein with reference to the drawings.

13. A computer program product comprising software code for completing a system as claimed in any preceding claim when loaded in a digital computer.

The Patent Office

INVESTOR IN PEOPLE

14

Application No: GB 9922589.8 **Examiner:** Russell Maurice
Claims searched: all **Date of search:** 12 April 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): G4A (AUXF)

Int Cl (Ed.7): G06F (17/60)

Other: Online EPODOC WPI PAJ selected internet sites

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2298299 A Meinikoff (see eg. abstract)	1 at least
X	GB 2294141 A Shepherd (see eg. abstract)	1 at least
X	http://www.creditrisk.com.au/intro.htm (see esp. http://www.creditrisk.com.au/closeout.htm)	1 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.